MONTHLY WEATHER REVIEW.

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INTRODUCTION.

This REVIEW contains a general summary of the meteorological conditions which prevailed over the United States and Canada during June, 1886, based upon the reports from the regular and voluntary observers of the Signal Service and from co-operating state weather services.

Descriptions of the storms which occurred over the north Atlantic Ocean during the month are also given, and their approximate paths shown on chart i. In tracing the centres of the paths of these storms, data from the reports of one hundred and seventy-two vessels have been used.

The southward movement of ice massed to the northward of Newfoundland has been unusually late, and large quantities of fixed ice were reported off the coast of Labrador at the close of the month.

On chart i for this month are traced the paths of eleven areas of low pressure; the average number for June during the last thirteen years being 8.7. The areas described as numbers viii and xi were probably of tropical origin; during the northward movement of number xi over the Gulf and across the Florida Peninsula on the 30th it was accompanied by gales and very heavy rainfall.

The mean atmospheric pressure, as compared with that for June of previous years, shows only slight departures from the normal.

The temperature for the month was generally below the normal over the entire country except in the northwestern portions and in southern Florida, the most marked deficiencies occurring in the middle and south Atlantic states.

The rainfall over the western and northern portions of the country was deficient, while a very large excess occurred in the region south of the Ohio and east of the Mississippi rivers.

Drought has prevailed during the month in many districts, being severest in Dakota, Iowa, Texas, and Indian Territory.

Chart vi exhibits curves representing results of observations with the electrometer upon atmospheric electricity, and under that head will be found notes referring to the same.

In the preparation of this REVIEW the following data, received up to July 20, 1886, have been used, viz., the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and thirty-three Signal Service stations and sixteen Canadian stations, as telegraphed to this office; one hundred and sixty-two monthly journals; one hundred and sixty monthly means from the former, and sixteen monthly means from the latter; two hundred and eighty-three monthly registers from voluntary observers; sixty-two monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the New England Meteorological Society, and from the local weather services of Alabama, Colorado, Georgia, Indiana, Minnesota, Missouri, Nebraska, Ohio, and Tennessee, and of the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The distribution of mean atmospheric pressure for June, 1886, determined from the tri-daily telegraphic observations of the Signal Service, is shown by isobarometric lines on chart ii.

The mean pressure for the month is greatest along the coast of Washington Territory and Oregon, where the barometric mean is shown by the isobar of 30.05. The mean pressure for Iowa and all of the United States lying east of the Mississippi River ranges from 29.92 to 29.98 and averages about 29.95. The pressure in Canada ranges from 29.95, in the lower lake region, to 28.85, in the lower part of the Saint Lawrence Valley. The area of barometric minima is enclosed by the isobar of 29.80, and covers an extensive portion of country, including Arizona, Nevada, Utah, Colorado, New Mexico, and western Texas. A small area, enclosed by the isobar of 29.75, lies in the southwestern part of Arizona; one station, Yuma, reporting a mean of 29.74.

The departures from the normal pressure are given in the tables of miscellaneous meteorological data, and are also shown on chart iv by lines connecting stations of equal departure. The pressure for the month is about normal, or slightly above, over the whole country, except in California, Texas, and the region lying south of the state of Pennsylvania and the Ohio River and east of the Mississippi River.

The mean pressure for June, when compared with that of the preceding month, shows an excess of .07 in New England, from which district it gradually decreases toward the west and southwest, until along the Missouri and Ohio rivers, and eastward through North Carolina, it coincides with the pressure for May. Over the remainder of the country the pressure is less than that of May, the greatest deficiency occurring in the southwestern districts.

BAROMETRIC RANGES.

The monthly barometric ranges at the various Signal Service stations are also given in the tables of miscellaneous data. The greatest ranges occurred in New England and westward to the Rocky Mountains. In the southern districts and along the Pacific coast the ranges were comparatively small.

The following are some of the extreme monthly ranges:

Greatest.	Inch.	Least.	Inch.
Portland, Maine	0.92	San Diego, California	0.27
Eastport, Maine	0.86	Key West, Florida	0.29
Boston, Massachusetts	0.83	Sanford, Florida	0.30
Albany, New York	0.83	Mobile, Alabama	0.32
Block Island, Rhode Island	0.82	Savannah, Georgia	0.32
New Haven, Connecticut	0.82	Chattanooga, Tennessee	0.32
Atlantic City, New Jersey	0.81	Los Angeles, California	0.32
New York City	0.80	Fort Davis, Texas	0.22
Sandy Hook, New Jersey	0.80	New Orleans, Louisiana	0.34

AREAS OF HIGH PRESSURE.

Seven areas of high pressure appeared within the limits of the United States during the month of June, 1886. They were

generally first observed north of latitude 50° and near the centre of the continent, although three of these areas approached from the Pacific coast, one of which crossed the Rocky Mountains north of Montana, and the remaining two extended over the north Pacific coast region until they disappeared, either to the north of the stations of observation, or by a gradual decrease of pressure. The general direction of movement was to the southeast while these areas covered the central portions of the continent, and the movement became more easterly as they approached the Atlantic coast. On the Pacific coast the general direction of movement was between north and northeast, with the exception that the area which crossed the Rocky Mountains moved directly east from British Columbia to the region north of Dakota. The high areas which reached the Atlantic coast all passed to the north of Virginia.

I.—This area of high pressure extended over the north Pacific coast region on the morning of June 1st, the barometer being below 30.20; it moved directly eastward, attended by increasing pressure, and on the morning of the 2d was clearly defined and central near the northern boundary of Montana, where the pressure had increased to 30.30, the high area at this time extending over the Missouri Valley and eastward to Lake Superior. The reports from the north Pacific coast showed a decrease of pressure ranging from .10 to .20, and indicated that this area of high pressure had passed to the east of the Rocky Mountains. During the 2d the movement was southeasterly over the Missouri Valley, attended by cool northerly winds and fair weather, and preceded by rains in the regions to the south and east, the rains occurring immediately before, or soon after, the winds shifted to the south, after which generally fair weather prevailed, except in the Gulf and south Atlantic states where the rains continued, with northeast winds, until this area disappeared east of New England on the 5th. It moved directly eastward from Iowa during the 3d and 4th, and was central south of Nova Scotia, near latitude 40°, on the morning of the 5th. This is the only area of high pressure observed during the month which passed eastward from the Pacific to the Atlantic, having its position approximately located at each of the tri-daily reports from the time of its first observation until its final disappearance.

II.—This area appeared north of Minnesota and Lake Superior on the morning of the 7th; it moved directly southeastward over the Lake region and was preceded by the development of an area of low pressure in the east portion of the Lake region; this low area moved northeastward with increasing energy, the path of the centre of the low area being almost perpendicular to that of the high area, and twenty-four hours after its development the area of high pressure covered, and was central over, the region where the area of low pressure was first observed. From the Lake region it passed over the middle Atlantic states, preceded by local rains along the Atlantic coast south of New York. It disappeared during the 9th to the east of the middle Atlantic states, the pressure decreasing as it approached the coast.

III.—This area appeared on the north Pacific coast at the 10 p. m. report of the 9th, apparently advancing slowly to the northeast; it remained almost stationary from the 9th to the 13th, and was preceded by an extended area of low pressure in the Rocky Mountain regions. When this area of low pressure developed energy and moved eastward, there was a general increase of pressure over the Rocky Mountain regions, which apparently resulted from this area of high pressure, although its movement cannot be traced from the tri-daily charts.

IV.—This was an area of relatively high pressure which formed in the Lake region and upper Mississippi valley on the 10th, while the barometer was low in the Saint Lawrence Valley and Rocky Mountain regions. It moved eastward and the pressure increased slightly during the 10th, and on the morning of the 11th it was central in the lower lake region. The pressure continued to increase during the 11th and 12th within this area, and on the 13th the area extended over Nova Scotia and New Brunswick and thence southward to the south Atlantic coast, the barometer being from .10 to .20 higher than it was when this area was in the Lake region. The reports indicate that this high area formed within the limits of the United States near the centre of the northern boundary, and there was a gradual increase of pressure attending the easterly movement. The weather was generally cool within this area, and snow fell on Mount Washington, New Hampshire, on the 13th, after the winds had shifted to easterly, and when the centre of the area was over New Brunswick.

V.—This area appeared on the 16th on the Pacific coast, where it remained until the 25th, with slight oscillations in pressure. It extended along the coast from southern California northward to British Columbia, the movement being northward, and the centre remaining to the west of the coast line. The barometer remained low during the greater part of this period in the Rocky Mountain regions. On the 19th and 20th there was an increase of pressure in the northern Rocky Mountain regions and on the north Pacific coast, resulting in the formation of a secondary high area east of the Rocky Mountains. This area extended over the upper Mississippi and Missouri valleys and southward to Texas, and probably caused the increase of pressure over the Southern States during the 24th and 25th, but the gradient was slight and no definite movement of the distinct high area could be traced from the charts. The main portion of this area remained to the west of the Rocky Mountains and disappeared during the 25th, although the barometer continued generally above the normal on the Pacific coast during the remainder of the month.

VI.—This area of high pressure was first observed central north of Minnesota on the morning of the 17th, being bounded by the isobar of 30.0, while the barometer was below 29.4 in the Saint Lawrence Valley. It extended southward over the central valleys during the 17th and 18th, after which it moved eastward from the Northwest to the middle Atlantic states and New England during the 19th and 20th, attended by fair weather in all districts east of the Mississippi. It was central off the New England coast on the morning of the 21st, the pressure having increased .30 during the transit from the upper Mississippi valley.

VII.—This area was first observed north of Minnesota on the afternoon of the 26th, and when low areas were observed to the east in the Saint Lawrence Valley, to the west north of Montana, and to the southwest in the Rio Grande Valley. It moved slowly southward, extending over the Lake region and Northwest during the 27th, 28th, and 29th, remaining central near the northern boundary of Minnesota. At the close of the month it was apparently moving eastward north of the Lake region, attended by clear weather in all sections, except on the south Atlantic and east Gulf coasts.

AREAS OF LOW PRESSURE.

Eleven areas of low pressure have been traced from the tri-daily weather charts of June, 1886. The most marked feature of the movement of the low areas for June is that but one has been traced from the Rocky Mountain region eastward over the Mississippi Valley. Five of the low areas traced passed eastward to the Atlantic north of the Saint Lawrence River; two were first observed in the east Gulf, causing severe gales on the Florida and south Atlantic coasts—one severe storm occurred in the west Gulf; and two developed in the Rocky Mountain regions, and one of these passed southward to Texas, the other moved eastward over British America and disappeared after reaching the longitude of western Lake Superior. In connection with the area of low pressure originating in the Rocky Mountains, there appeared an area of low pressure which remained in this region from the 11th to 16th and then disappeared by an increase of pressure without definite movement of translation.

The following table shows the latitude and longitude in

which each area was first and last observed, with the average rate of movement in miles per hour:

Areas of low pressure.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	
No. I	39 00	97 00	52 00	62 00	35.0
II	45 00	81 00	50 00	57 00	30.0
III	40 00	107 00	40 00	102 00	.....
IV	25 00	96 00	30 00	93 00	14.0
V	47 00	77 00	50 00	57 00	31.0
VI	53 00	115 00	51 00	90 00	16.0
VII	43 00	111 00	26 00	98 00	27.0
VIII	24 00	87 00	39 00	72 00	17.0
IX	38 00	87 00	45 00	59 00	17.0
X	54 00	70 00	48 00	57 00	22.0
XI	16 00	80 00	30 00	63 00	29.0

Average hourly velocity, 23.8 miles.

I.—On the morning of the 1st this area was central in eastern Kansas, bounded by the isobar of 29.8, with areas of high pressure extending over New England and over the north Pacific coast and northern Rocky Mountain region. It moved to the northeast, separating the two areas of high pressure previously referred to, and passed over the Lake region on the 1st and 2d, attended by heavy local rains. These rains occurred in the western quadrants and were apparently caused by the cold north winds from the area of high pressure to the westward. These local rains were reported from the Lake region, Tennessee, and Ohio Valley on the 1st and 2d, and in the Atlantic coast districts on the 3d. This storm increased in energy as it moved northeastward over the Saint Lawrence Valley. When last observed, on the afternoon of the 3d, the pressure had decreased to 29.51 at Anticosti Island, and brisk to high southwest winds were reported at northeast stations.

II.—This area, as previously stated, developed in the Lake region, over Lake Huron, to the southeast of an area of high pressure, on the morning of the 7th. When first observed it was bounded by the isobar of 29.9; it moved to the northeastward, with decreasing pressure at the centre, causing westerly gales in the lower Saint Lawrence valley on the 8th. This low area was attended by light rains on the Atlantic coast and in the Lake region, the rains being chiefly due to changes in temperature resulting from the area of high pressure which followed. The northeasterly movement continued during the 8th, when this area passed to the eastward of Newfoundland.

III.—On the morning of the 10th areas of low pressure were observed over the southern plateau region and to the north of Dakota, and over the region separating these areas the barometer was from .20 to .30 below the normal. Local storms were reported from the Rocky Mountain regions and the upper Mississippi valley during the 11th, 12th, and 13th, while the area of low pressure remained almost stationary in the central Rocky Mountain region. There was a slight easterly movement of the central area observed during the 13th and 14th; this easterly movement resulted in the formation of several secondary low areas, which, after reaching the central valleys, attended by local storms, disappeared by a general increase of pressure during the 16th and 17th.

IV.—This storm was apparently central south of Brownsville, Texas, and to the east of the coast line, on the 13th, and the succeeding reports on the 13th and 14th indicate that it moved northward, parallel with the coast line, until it reached Galveston, Texas, on the morning of the 14th; the wind reached a maximum velocity of fifty miles from the northeast at that station on the morning of the 14th, the barometer reading 29.47. The wind shifted to the west during the 14th, when the centre was apparently near the north Gulf coast, after which it was not possible to trace the movement of this low area. This storm was very destructive in the vicinity of Galveston, Texas.

The following notes relative to this storm have been received:

Galveston, Texas: on the morning of the 13th the barometer was low, and continued falling all day, with brisk east winds. At 11.15 p. m. a gale of twenty-seven miles per hour set in and continued, gradually increasing in force. At 5.50 a. m. of the 14th the gale had attained its maximum velocity of fifty miles per hour, from the northeast. At 8.30 a. m. the barometer stood at 29.43, wind from the north and veering, and shortly after was from the northwest, when the barometer began rising slowly. At 8.05 a. m. and at 8.40 a. m. the wind was fifty miles per hour, from the north. Owing to the high east and northeast wind the water in the Gulf front rose to such an extent that there were fears of a repetition of the overflow of 1875, but the wind backing to northwest cleared the bay and prevented what might have been a serious disaster. The storm was particularly dangerous to light shipping in the harbor, many of the smaller craft being considerably damaged. Along the beach the street car and the Texas Mexican railroad lines were washed out and a dwelling house, two saloons, and numerous bath-houses were completely demolished. Rain fell at intervals during the storm.

Orange, Orange county, Texas: a very heavy northeast gale blew here all day on the 14th, doing much damage to crops and vegetation. The storm was accompanied by very heavy rainfall.

Sabine Pass, Jefferson county, Texas: between Taylor Bayou and this place eight miles of the railroad track were washed out by the storm of the 14th. Several residences, warehouses, and all the wharves at Sabine City were either blown or washed away. The water rose seven feet above the ordinary high-tide level, submerging the entire town and the country for miles in its rear. Cattle suffered severely for fresh water, as all the inland lakes and pools were impregnated with the saline waters of the Gulf.

V.—On the 16th an extended area of low pressure existed north of the Lake region and Saint Lawrence Valley. Local rains and thunder-storms were reported from the Lake region, and an area of high pressure was forming to the westward of Lake Superior. During the 17th the barometer fell rapidly in the Saint Lawrence Valley, and by morning of the 18th it had fallen to 29.07 at Anticosti, near the centre of this storm, the movements of which were definitely traced from longitude 77° W., latitude 47° N., where it was central on the morning of the 17th. Severe westerly gales occurred at northeast stations on the 18th.

VI.—This depression is approximately traced, as it was at no time within the limits of the stations of observation. It was first observed north of Montana on the afternoon of the 17th, and was last observed north of Lake Superior at midnight of the 20th. When the depression disappeared north of Lake Superior areas of high pressure were central on the middle Atlantic and north Pacific coasts, and severe gales were reported on the east Gulf coast, due to the advance or development of the storm traced as number viii.

VII.—The tri-daily reports received at midnight of the 17th indicated that a low area was developing over the southern plateau region, and, at the same report, the area of low pressure traced as number vi was central immediately to the north of Montana. The barometer was generally low in all the Rocky Mountain plateau regions, and an extended area of high pressure covered the central valleys. During the succeeding forty-eight hours there was a slow movement of this barometric trough to the eastward, attended by a corresponding movement of the high area to the eastward. As previously stated the area of low pressure disappeared to the northward of Lake Superior, while this low area moved southeastward over the Rocky Mountain regions and thence southward to the lower Rio Grande valley, where it was last charted on the afternoon of the 20th, on which date the barometer was generally low over the whole of the Gulf of Mexico, and a tropical storm, traced as number viii, was moving northward over the east Gulf.

The following note relates to this storm:

Waco, McLenan county, Texas: a heavy wind and rain storm passed over the interior and eastern portions of the state during the night of the 19–20th, doing great damage to property in towns and to crops in the country. At this place several houses were wrecked and one man wounded. Several houses were blown down in Dallas. At Weatherford a large grain warehouse, a church, and several dwellings were completely destroyed and a number of other buildings damaged. In the country large areas of cotton, corn, and other crops were destroyed and buildings blown down.

VIII.—The reports received from the West Indies show that severe gales occurred south of Cuba and west of Jamaica on the 19th, but these reports are not sufficient to justify the extension of the track of this storm south of the twenty-fifth parallel, where it was probably central, near the eighty-seventh meridian, on the morning of the 20th. This storm moved directly northward over western Florida, causing a

severe southerly gale at Key West and Cedar Keys, and dangerous easterly winds along the south Atlantic coast on the 20th, 21st, and 22d. It moved over the south Atlantic states, inclining slightly to the eastward, and passed off the middle Atlantic coast, attended by dangerous winds south of New York. After reaching the New Jersey coast the storm apparently decreased in energy and the direction of movement changed to the eastward. It was last marked as central south of Long Island, near the fortieth parallel.

The Signal Service observer at Cedar Keys, Florida, reports as follows:

At 8.35 p. m. of the 20th a heavy rain storm, accompanied by violent east and northeast winds, prevailed at this place, and continued with considerable energy all night. The wind came in squalls, blowing at times during the night at the rate of seventy-five to ninety miles per hour, shaking the strongest houses in the town and prostrating trees, telegraph poles, and signs. Between 10 and 11 p. m. the wind blew from the east sixty-eight miles per hour; this is the highest velocity ever recorded here, but owing to the direction from which it came but little damage was done.

The following information in regard to this storm has been obtained from Cuban newspapers forwarded to this office by the Rev. Benito Viñes, Director of the Belin College Observatory, Havana, Cuba:

HAVANA, CUBA, *June* 21, 1886.—The heavy rain storm which prevailed during the last few days began on the 17th and 18th, in the immediate vicinity of the Yucatan Canal and in the adjacent portion east of the Gulf, where it remained about stationary during four consecutive days. The rains were copious and persistent from the central part of the island to Cape San Antonio, on the coast of Yucatan, and in the Gulf States. The rain caused heavy floods, and various localities were inundated.—*Diario de la Marine, June* 21, 1886.

Rev. Benito Viñes, of the Belin College Observatory, also furnishes the following:

HAVANA, *June* 28, 1886.—The heavy rain which fell in Vuelta Abajo from June 17th to June 24th has been unexampled in Havana during the month of June for the last twenty-nine years.

IX.—This area of low pressure apparently developed in the lower Ohio valley during the 23d. It moved slowly northeastward as a slight depression, attended by local rains and thunder-storms in the Northern States. The barometer fell near the centre of this depression as it passed northeastward to the lower Saint Lawrence valley, and after the centre reached the vicinity of Father Point, Province of Quebec, the indications are that the direction of movement changed from northeast to southeast. This low area was apparently central to the east or southeast of Sydney, Nova Scotia, when last observed on the morning of the 27th.

X.—This area was observed far to the north of New England at midnight of the 28th. It apparently moved southeastward over the Atlantic, developing considerable energy as it passed over the Maritime Provinces. It was attended by severe gales in the Gulf of Saint Lawrence on the 29th and 30th, the barometer falling below 29.40 near the centre of disturbance. No marked changes in the meteorological conditions in the United States occurred during the movement of this storm to the eastward, and the area of high pressure which followed caused a continuation of fair weather.

XI.—This storm approached the east Gulf coast during the 30th, attended by severe gales and heavy rains. The reports received from vessels and from stations in the West Indies indicate that it existed to the south of Cuba on the 27th and 28th, and that it passed northward, probably crossing the twenty-fifth parallel near the eighty-ninth meridian on the 29th. The track of the centre of this storm is approximately given on chart i.

Rev. Benito Viñes, director of the Belin College Observatory, Havana, Cuba, has collected, and forwarded to the Chief Signal Officer, information relative to this storm, as follows:

Immediately after the 26th the barometer rose to an extraordinary height, indicating the approach of a cyclonic disturbance. On the 27th the disturbance, it seems, had existed in the sea south of the island, and during that and the succeeding day it came rapidly upon us, through the third quadrant, with heavy squalls, from the east and southeast, in the central and western provinces of the island. On the 29th the cyclonic disturbance probably crossed to the extreme west of the island.

According to a dispatch received from the mayor of Batabano, dated the 28th, 2.30 p. m., a very heavy wind from the southeast prevailed at that place, causing some damage to boats in the harbor.

The commanding officer of Fort San Fernando states that during the 28th the American schooner "Siggal" was lost and two sailors drowned; the remainder of the crew (seven in number) were saved and cared for at Fort San Fernando.

"The Guojiro of Sancti Spiritus" states that on Wednesday, June 30th, Capt. Charles W. Hunter arrived in the port at Tunas and made the following statement: Sailed with the English schooner "Daizy," the 26th; on the evening of the same date, in lat. 19° 34′, long. 79° 10′, the wind was from the east; at 10 a. m. the day following, being west of Jamaica, the hurricane was at its greatest force and the sea very high. On Monday the wind calmed.

The "Diario de la Marine" (published at Havana), of June 30, 1886, contained an extract from the "El Diario de Cienfuegas," of June 28th, as follows:

At 8 o'clock this morning heavy gusts of wind from the southeast prevailed; the wind, which was moderate in force during the first hours, increased in force up to 2 p. m., blowing from the same quarter. The "El Gloria" which sailed this morning at 10 o'clock for Trinidad, arrived there at 1.30 p. m. Captain Muniátegul states that the wind was very severe and the sea high. The barometer was very high and remained stationary for twenty-four hours.

The following observations made at Coloma, Cuba, by Manuel Yago, Adjutant of Marines, were also forwarded by Rev. B. Viñes:

Time of observation.	Barometer.		Temperature.		Wind.			Weather.	
	Inches.	Millimetres.	Fahrenheit.	Centigrade.	Force, 0-10.	Direction.	Sky.	Horizon.	
28th, 5 p. m.	30.12	765.0	73.8	26.0	6	n.	cs.	Covered..	Heavy squalls.
6 p. m.	29.92	760.0	75.2	24.0	6	nnw.	ks.	Covered..	Heavy squalls.
7 p. m.	29.80	757.0	71.6	22.0	9	nw.	ks.	Covered..	Heavy rain squalls.
8 p. m.	29.63	752.5	75.2	24.0	9	w., sw.	ks.	Covered..	Heavy squalls.
9 p. m.	29.49	749.0	71.6	22.0	8	w.	ks.	Covered..	Heavy squalls.
10 p. m.	29.57	751.0	73.4	23.0	9	sw.	ks.	Covered..	Heavy squalls.
11 p. m.	29.92	760.0	75.2	24.0	10	ssw.	ks.	Covered..	Heavy squalls.
12 p. m.	30.04	763.0	77.0	25.0	10	s.	ks.	Covered..	Heavy squalls.
29th, 1 a. m.	30.04	763.0	77.0	25.0	6	s.	ks.	Covered..	Heavy squalls.
2 a. m.	30.04	763.0	77.0	25.0	9	ssw.	ks.	Covered..	Heavy squalls.
3 a. m.	30.04	763.0	77.0	25.0	7	sse.	ks.	Covered..	Heavy squalls.
4 a. m.	30.04	763.0	77.0	25.0	6	se.	n.	.....	Clear in 2d quadrant.
5 a. m.	30.04	763.0	77.0	25.0	5	se.	cs.	.....	Clear in 2d and 3d quadrants; thunder.
6 a. m.	30.04	763.0	77.0	25.0	5	se.	cs.	.....	Clear in 2d, 3d, and 4th quadrants.
7 a. m.	30.08	764.0	75.2	24.0	5	se.	cs.	Clear.....	Clearing.
8 a. m.	30.12	765.0	75.2	24.0	5	se	ck.	Clear.....	Clearing
9 a. m.	30.08	764.0	75.2	24.0	5	se.	ck.	Clear.....	Clearing.

The following notes indicate the severity of this storm during its passage over the Florida Peninsula:

Tallahassee, Florida: on the 30th a disastrous gale occurred at this place and over the adjacent country. Rain began to fall about 4.00 a. m. and continued until midday, with occasional gusts of wind; about 12 m. a violent southeast gale set in accompanied by heavy rain, which continued until after 6 p. m. It is estimated that the wind blew at the rate of eighty miles per hour. The damage to this town, mostly to roofs, fences, windows, and shrubbery, was not very great, but considerable damage was done to crops in the country; at Ocklockonee, eight miles west of Tallahassee, two large lumber sheds and a mill were demolished; fences were blown down and corn broken off. Little River Bridge on the Mobile and Pensacola Railroad was partly undermined. In Jefferson county four houses were blown down and one man was killed.

Cedar Keys, Florida: during the afternoon of the 30th the wind blew hard from the east-northeast, and increased steadily in velocity until 10.30 p. m., when it veered to the east and attained the velocity of a high gale, and continued blowing with great energy during the night. The damage done by the storm was light, the display of cautionary signals causing the few vessels in harbor to take extra precautions. Some injury to roads was done by high tides, and one warehouse was blown from its foundation.

Appalachicola, Florida: a very heavy gale of almost hurricane force occurred here on the 30th. About 10 a. m. the wind commenced to blow a light gale from the southeast, and by 1 p. m. it had increased to seventy miles per hour; at 4.30 p. m. there was a lull in the storm and the wind suddenly changed from the southeast to the opposite direction, and blew with great force, unroofing houses, throwing down smoke-stacks, and destroying frame structures. The greatest damage was done to shipping in the bay; several vessels were capsized, some were sunk, and nearly every one in the harbor was more or less injured; several lives were lost. Along the river above Appalachicola large trees were blown down, corn broken off, and crops generally were greatly damaged.

Savannah, Georgia: during the afternoon and night of the 30th a very heavy gale and rain prevailed over southern Georgia. It was very destructive to corn and cotton crops and fencing throughout the country. The fol-

lowing note, relative to this storm, is from the "Georgia Crop Report" of July, 1886:

"A destructive wind storm, with heavy rain, occurred on the 30th of June in east and southwest Georgia, doing great damage to crops. The storm passed over Washington, Twiggs, Brooks, Thomas, and Dougherty counties, covering in its track the width of several counties in the extreme northwestern part of the state."

NORTH ATLANTIC STORMS DURING JUNE, 1886.

[*Pressure in inches and millimetres; wind-force by Beaufort scale.*]

The paths of the depressions that have appeared over the north Atlantic Ocean during the month are determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ships' logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports received through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs furnished by the proprietors of the "New York Maritime Register," and from other miscellaneous data received at this office up to June 20, 1886.

Of the fourteen depressions traced during the month, five, numbers 3, 5, 9, 13, and 14, are continuations of areas of low pressure traced on the North American continent; number 1 is a continuation of ocean depression number 10 charted for May, 1886; numbers 2, 4, 7, and 11 originated over the ocean east of the thirty-sixth meridian, and numbers 6, 8, 10, and 12 developed between the coast of North America and the forty-second meridian.

The following presents the characteristics of the depressions traced for the present month, as compared with those traced over the north Atlantic for June, 1885:

In June, 1885, six depressions appeared within the area covered by the observations; of this number, five were continuations of areas of low pressure originating over the North American continent. The general direction of movement of the depressions was east-northeasterly. With the exception of one depression, which passed south of Newfoundland during the 6th and 7th, the areas of low which passed over the ocean during June, 1885, were shallow.

In June, 1886, the general direction of movement of storm-tracks was east-northeasterly; the exceptions being numbers 2 and 4, which appeared east of the twenty-sixth meridian and first assumed a southeasterly course; number 10, which disappeared in a southeasterly direction, and number 12, which first moved slightly south of east. The depressions were, as a rule, of slight depth, and their passage was not accompanied by atmospheric disturbances of unusual violence. The very violent and destructive cyclones which passed to the westward of the West Indies and through the Gulf of Mexico are traced and described under the heading of "Areas of low pressure" in this REVIEW. The rate of progression of the depressions was, as a rule, rapid.

The month opened with an area of high pressure over mid-ocean. An area of low, central on the 1st over the British Isles, dominated the weather as far west as the thirty-fifth meridian; and light rains prevailed from the forty-third meridian to the coast of North America. The pressure continued high over mid-ocean until the 8th; from which date until the 12th stormy weather prevailed east of the fiftieth meridian and north of the fortieth parallel, attending the passage of depression number 5. During the 11th and 12th rains and gales were encountered over the entire ocean north of the fortieth parallel. From the 14th to 16th the pressure diminished rapidly over mid-ocean, and moderate to fresh gales were experienced between W. 30° and 50°. During the 15th and 16th the pressure was high in about N. 45°, W. 20°; this area moving slowly eastward to and over the British Isles during the next four days. From the 18th to 23d the weather was unsettled over mid-ocean and westward to the North American coast, and relatively low pressure and rain-areas continued west of the thirtieth meridian from the 26th to the close of the month.

The following are brief descriptions of the depressions charted:

1.—This storm was a continuation of depression number 10 traced for May, 1886, and moved northeastward from the northwest coast of Spain during the latter half of May 31st and the forenoon of June 1st. At noon (Greenwich mean time) of the 1st it was apparently central over England, with central pressure about 29.70 (754.4). Its influence was manifested over the ocean by moderate gales and rains as far west as the fifteenth meridian. During the 1st the centre of disturbance passed eastward beyond the region of marine observations.

2.—The development of this depression was indicated by reports of the 1st in about N. 50°, W. 25°. During this date the barometric gradient to the westward was very steep, and the centre of depression was forced southeastward to N. 47°, W, 12° by the 2d, with a slight decrease in central pressure, and fresh gales and rains to the west and northwest. During the next twenty-four hours the storm-centre moved east six degrees; disappearing to the eastward of the region of reports during the 3d.

3.—This depression was a continuation of low area number i, which first appeared over the North American continent, and passed off the coast of Labrador, in about N. 53°, during the early morning of the 4th. At 12 noon (Greenwich mean time) of the 4th the depression was apparently central in N. 54°, W. 50°, but an absence of reports renders it impossible to trace its subsequent course.

4.—This depression apparently advanced southeastward from the neighborhood of Greenland and was central on the 8th in N. 56°, W. 23°, with pressure ranging to about 29.60 (751.8); passing southeastward it was central on the 9th off the southwest coast of Ireland, with a slight increase in central pressure. Chief Officer J. Carson, of the s. s. "Palestine," Capt. W. Whiteway, commanding, makes the following report relative to this storm: "June 8th, in N. 51° 18′, W. 21° 37′, at night, moderate gale began from s., veering to wnw. in a. m. of 9th (position at noon N. 50° 53′, W. 26° 25′) and increased to strong wnw., with heavy squalls and high seas, moderating at night." Chief Officer Jos. Osienak, of the s. s. "Venetian," Captain Trant, commanding, reports having experienced in N. 50° 0′, W. 25° 0′, on the 9th, strong breezes to moderate gales from the w., with heavy and rough head seas. During the 9th this depression passed eastward of the limit of reports.

5.—This storm was a continuation of land depression number ii and passed eastward over Newfoundland during the 8th. At 12 noon (Greenwich mean time) of the 9th it was central in about N. 51°, W. 44°, with pressure about 29.60 (751.8); from this position it moved north of east to N. 54°, W. 29° by the 10th, with lower pressure, strong gales, and heavy rain. During the next twenty-four hours it passed northeastward to N. 59°, W. 17°, disappearing to the northeastward of the region of observation during the 11th, with lower pressure and evidence of great energy. This depression was accompanied by the severest storms of the month, and warning of its approach was cabled to London.

The following are reports received from vessels which came within its influence:

The s. s. "St. Laurent," Captain Baquesne, commanding, experienced a fresh gale on the 9th from the sw. Lowest barometer, 29.49 (479.0), at midnight of the 9th, in N. 49° 57′, W. 34° 04′; wind veered from sw. to w. as the disturbance progressed, and to wnw. following its passage. Capt. G. Moodie, commanding the s. s. "State of Georgia," reports "a fresh to strong gale on the 9th and 10th; lowest barometer, 29.39 (746.5), at 9.30 p. m. of the 9th, when in N. 51° 43′, W. 32° 46′. The gale set in from the se., shifting to sw. during, and to wsw. following, the passage of the disturbance. This storm was remarkable for the large amount of rain both before and after its passage, as well as for its force and duration for the season of the year; it seems to have extended fully half way across the Atlantic."